Archaeological
Institute
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THE MAUSOLEUM AT HALICARNASSUS

[PLATE I]

I. THE ORDER

IN spite of the numerous attempts to restore the design of the Mausoleum at Halicarnassus, many facts concerning this structure still remain unsettled, chiefly because it has not been considered in its relation to other works of Greek architecture, and with reference to the question how Pythius[1] and Satyrus, the architects selected by Artemisia, must have proceeded in designing a great sepulchre at about the middle of the fourth century B.C.

I shall, therefore, take first the order of the peristyle, the part which determined the proportions of the entire monument, and, regarding it from the standpoint of Pythius, attempt to discover its exact dimensions. In such an investigation we are aided by two facts: the order had to be Ionic, then the universal style of the Greek coast of Asia Minor[2]; its proportions could vary only within narrow limits at any given period, as will appear from a general outline of the history of this order.

The Ionic order from its very origin was identified with Asia Minor; the ancient tradition appears in Vitruvius (IV, 1, 7–8), and modern research has tended to show that capital, base, and

[1] This seems to be the correct form. The name is given in different manuscripts of Vitruvius as Pythius, Pythios, Pytheus, Phyleos, Phyteus, etc.; the two first seem best supported, being found in the oldest manuscript, the Codex Harleianus of the ninth century. Pliny (XXXVI, 30) gives Pythis, probably an error in transcription.

[2] The "Lion Tomb" at Cnidus was Doric only because it was (probably) erected by the Athenians; cf. C. T. Newton, *History of Discoveries at Halicarnassus, Cnidus, and Branchidae*, II, pp. 491–494.

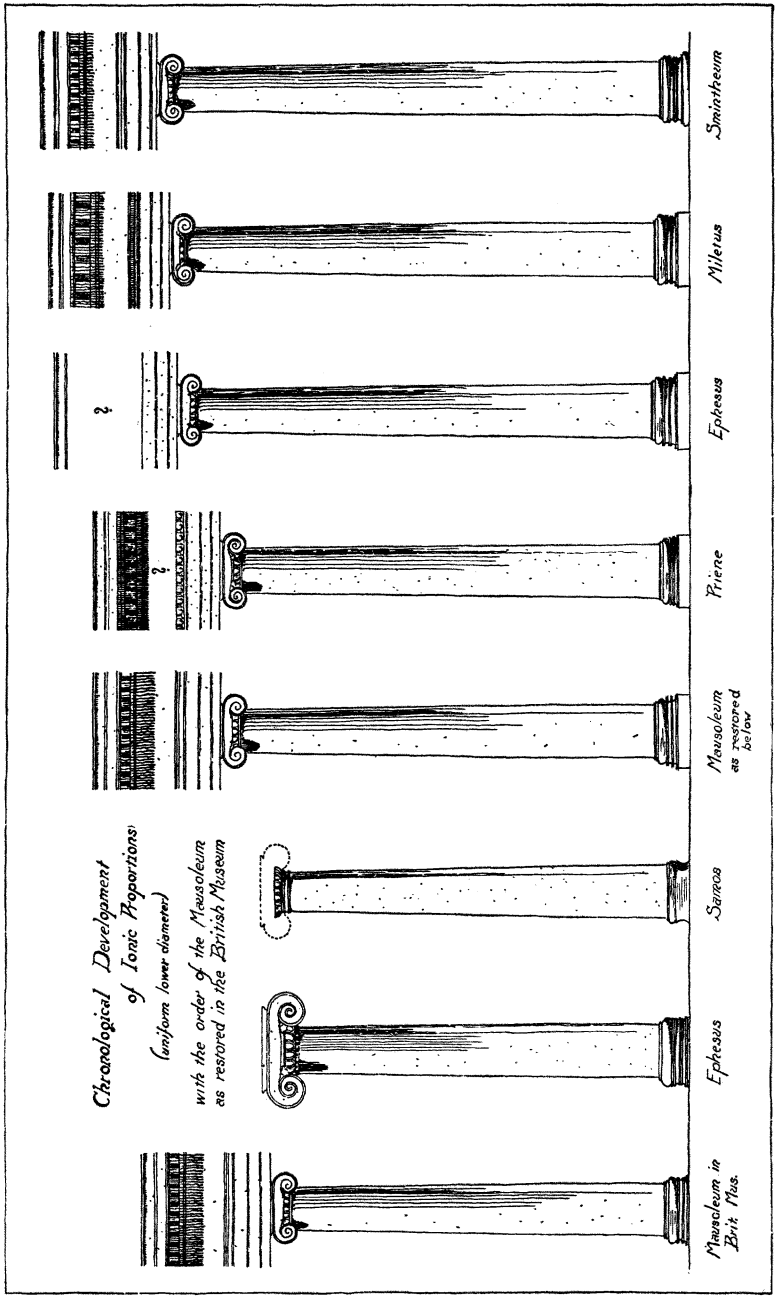


FIGURE 1.—THE IONIC ORDER IN ASIA MINOR.

entablature can all be traced back to Assyria. Purely Oriental forms appear in the earliest Greek examples, at Cyprus, Neandria, Mitylene, and Nape in Lesbos. The type of the order was fixed in the second half of the sixth century, especially in the great temples of Artemis at Ephesus and of Hera at Samos, after which there was little activity; the older temple of Artemis Leucophryene at Magnesia stands alone in the fifth century. Our knowledge of the stage of the development at about 400 B.C. rests on the temple at Messa in Lesbos, the earliest known Ionic pseudodipteros. The Mausoleum was the first great structure of the school of Pythius; it was closely followed by the temples of Athena Polias at Priene, Artemis at Ephesus, and Apollo Didymaeus near Miletus. After the death of Alexander a second school appeared, that of Hermogenes, marked by new systems of proportion, exemplified in the later temple of Artemis at Magnesia and in that of Dionysus at Teos. The temple of Apollo at Sminthe in the Troad shows the mingling of both schools. Finally, in the period of the decline, the vitality of the national style was lost, as shown in the late temples at Aphrodisias, Aizani, and Labranda.

It is by examining the proportions of the orders (Fig. 1) of these temples, both before and after 350 B.C., that we can best judge of the stage of the development at the period of the erection of the Mausoleum. Therefore I have drawn up the following table,[1] giving 1) the lower diameter of the column in English feet, and 2) the height of the column, 3) the height of the entablature, 4) the total height of the order, and 5) the intercolumniation (spacing on centres), all in terms of the lower diameter of the column. The buildings are arranged in chronological order.

	Lower Dia.	Col. Ht.	Entab. Ht.	Order Ht.	Intercol.
Neandria . .	1.74 ft.	?	?	?	4.59 dias.
Ephesus (1) .	4.37 ft.	8.00 dias.	?	?	3.98 dias.
Samos[2] . . .	6.12 ft.	8.03 dias.	?	?	?
Messa . . .	3.39 ft.	?	2.51 dias.	?	2.86 dias.
Mausoleum .	* *	* *	* *	* *	* *

[1] The data on which this table is based, together with the authorities, are given in the Appendix.

[2] The date of the standing column is uncertain. See Appendix.

	Lower Dia.	Col. Ht.	Entab. Ht.	Order Ht.	Intercol.
Priene [1] . . .	4.24 ft.	8.81 dias.	2.34 dias.	11.15 dias.	2.72 dias.
Ephesus (2) .	6.06 ft.	9.60 dias.	?	?	2.82 dias.
Miletus . . .	6.52 ft.	9.75 dias.	2.27 dias.	12.02 dias.	2.74 dias.
Smintheum .	3.88 ft.	?	2.20 dias.	?	2.52 dias.
Magnesia . . .	4.61 ft.	?	2.12 dias.	?	2.80 dias.
Teos	3.38 ft.	?	2.13 dias.	?	3.14 dias.
Aphrodisias .	3.61 ft.	8.47 dias.	2.20 dias.	10.67 dias.	2.37 dias.
Aizani . . .	3.21 ft.	9.83 dias.	1.84 dias.	11.67 dias.	2.59 dias.
Labranda . .	2.86 ft.	9.52 dias.	1.94 dias.	11.46 dias.	3.00 dias.

The table shows a gradual rise in the height of the column, beginning with 8.00 diameters at Ephesus, and reaching 9.75 at Miletus ; that of the Smintheum, restoring the uppermost drum, which alone is missing, was almost 10 diameters; then Hermogenes reduced the height at Teos (and probably also at Magnesia) to about $9\frac{1}{4}$ diameters.[2] Corresponding to this increasing slenderness of the column came a gradual lightening of the load to be supported ; the entablature in its earliest complete state at Messa is about $2\frac{1}{2}$ diameters high, and finally, in the work of Hermogenes, it is only $2\frac{1}{8}$ diameters. That the structure might not seem too weak, the columns, as they became more slender, were placed nearer together. This is a movement which went on uninterruptedly[3] from the earliest period to the time of Hermogenes; he, however, thickened the columns, and so was enabled to get wide intercolumniations and a wide pteroma around the naos. With these later

[1] Priene : entablature 2.34 diameters, hence order 11.15 diameters. This is theoretical ; the German excavations (Wiegand and Schrader, *Priene*, pp. 98 ff.) have shown that, as actually carried out, the frieze was omitted, and the dentil course was set directly on the ovolo crowning the epistyle. Such an omission in a monumental order is inexplicable, though it occurs in the small colonnades of the Leonidaeum at Olympia and of the Great Altar at Pergamum, in the small temple of Asclepius at Priene, as well as in the "Porch of the Maidens" of the Erechtheum. But the frieze was customary in the work of the school of Pythius ; Pontremoli found it at Miletus, and in the temple at Ephesus, though the actual frieze blocks are lost, the crowning moulding with the congé, forming the transition to the zoöphoros, exists in the British Museum. We shall see that a frieze is required and fits in the entablature of the Mausoleum.

[2] Pullan (*Antiquities of Ionia*, IV, 1881, ch. II) restored the column as *ca.* 31.295 ft. high.

[3] The only exceptions are in the work of Paeonius at Ephesus and Miletus, and these two in themselves show the tendency.

changes we are not concerned; Pythius lived and worked while the development of the order was unbroken. Therefore we should expect that in the Mausoleum, after fixing the lower diameter, he would have made the height of the column somewhat less than 8.81 times this diameter, the entablature height between 2.34 and 2.51 times the diameter, and the intercolumniation between 2.72 and 2.86 times that diameter. Vary from these he could not, without breaking away from the traditions of his art; he is not mentioned, like Hermogenes, as having done this, and his work at Priene follows the general tendencies.

One more question remains to be determined. Before the architect could design an order according to these proportions, some single dimension had to be fixed; and this, as we learn from the reflections of Greek practice in Vitruvius, was the lower diameter of the column. For this primary dimension he would naturally have employed a certain unit of measure a certain number of times, without the infinite fractions which are present when we measure ancient columns in metres or English feet. What was this Greek unit? The answer is given by the unfluted standing column of the temple near Miletus. Here each of the eighteen drums[1] had an incised rectangle containing a group of figures; those preserved are as follows:

seventh drum from top	$6 : \frac{1}{8}$
tenth drum from top	$6 : \frac{1}{4} : \frac{1}{8} : \frac{1}{16} : \frac{1}{32}$
twelfth drum from top	$6 : \frac{1}{2} : \frac{1}{8} : \frac{1}{16}$
thirteenth drum from top	$6 : \frac{1}{2} : \frac{1}{4}$

These are the diameters to which the individual drums were to be finished; that of the thirteenth drum from the top, $6\frac{3}{4}$ units, being at a third of the height of the column, is the same as that of the lowest drum, on account of the entasis. The lowest drum was measured as 1.98 m., which, divided by $6\frac{3}{4}$, gives the length of the unit as $293\frac{1}{3}$ mm. This unit is obviously the Greek foot, determined by Dr. Dörpfeld[2] from the measurements of Attic buildings as 295.7 mm. Applying such

[1] Pontremoli and Haussoullier, *Didymes*, pp. 72–75.
[2] *Ath. Mitt.* VII, 1882, pp. 277–312.

a foot to the measured column diameters of various Ionic temples, we find

at Ephesus (1),	lower dia. of . .	$4\frac{1}{2}$ Greek ft.	= 1.331 m. (1.33 m.)
at Samos	lower dia. of . .	6 ft. 5 dactyls	= 1.867 m. (1.867 m.)
at Messa	lower dia. of . .	$3\frac{1}{2}$ Greek ft.	= 1.035 m. (1.04 m.)
at Priene	lower dia. of . .	$4\frac{3}{8}$ Greek ft.	= 1.293 m. (1.289 m.)
at Ephesus (2)	lower dia. of . .	$6\frac{1}{4}$ Greek ft.	= 1.848 m. (1.842 m.)
at Miletus	lower dia. of . .	$6\frac{3}{4}$ Greek ft.	= 1.996 m. (1.98 m.)
at Magnesia	lower dia. of . .	$4\frac{3}{4}$ Greek ft.	= 1.400 m. (1.40 m.)

The dimensions in parentheses are those actually measured.[1] These instances are sufficient to prove that the lower diameter of the column, the unit of the design, was laid out at the very beginning with a "foot rule," the foot in this case being 295.7 mm. or 11.6417 inches.

So much can be stated without the least knowledge of the Mausoleum itself; it now remains for us to discover, from the existing fragments and the descriptions, to what extent Pythius adhered to this precedent.

Turning to the fragments which still remain, we note that the lower diameter of the column was measured by Pullan[2] as 3.535 English feet. This is nearly equivalent to 3 feet $10\frac{1}{3}$ dactyls Greek. But the diameter of the column in the case of every temple of Asia Minor is composed of an even number of dactyls, in all cases (except Samos) a few feet and a simple fraction of a foot. Now $10\frac{1}{3}$ dactyls is an impossible fraction of a foot; and, indeed, measurements from the original lowest drum in the British Museum (No. 980), taken with Greek units,[3] give a very different result:

circumference about fluting	11 ft.	9.75 dact.
circumference about fillet of apothesis	12 ft.	8.75 dact.
∴ diameter through fillet		63.90 dact.
projection of fillet beyond lower diameter		2.00 dact.
∴ lower diameter of column		59.90 dact.

In other words, the lower diameter is 60 dactyls, or $3\frac{3}{4}$ Greek feet, equivalent to 3.635 feet English.

[1] Those of Priene and Ephesus, 4.23 and 6.04 English feet, are given in metres for convenience.

[2] Newton, *History of Discoveries*, I, pl. 22.

[3] For these and the following measurements I employed a folding 2-foot rule and a 25-foot cloth tape, both laid out in Greek feet and dactyls.

After the lower diameter, the interval between the columns must be settled; this was fixed more by custom than by the architect's own will. I shall attempt to determine the intercolumniation by three methods: 1) by the general tendency of the period; 2) by the spacing of the lion heads on the sima; and 3) by evidence from Pliny.

In the table of Ionic proportions we note that in the fourth century the intercolumniation had diminished greatly since the early days of the order, and was then hovering about 2.80 times the column diameter. This is what we should expect in the Mausoleum, as in date it lies between Messa with its 2.86 and Priene with its 2.72 diameters.

The sima of the order, as shown by existing fragments, had lion-head spouts at intervals; these, judging from other Greek

FIGURE 2.—SIMA OF THE CORNICE, MAUSOLEUM.

structures, should have been so arranged that one came over the axis of every column and one or two between.[1] The spacing of these lion heads is therefore important. Each slab of the sima was 28 dactyls long (fragments in British Museum, No. 986); palmette and honeysuckle ornaments alternate, spaced 7 dactyls on centres. One slab (Fig. 2) has at the right end a lion's head, so carved that only half belongs to this slab, while the other half is free to cover the left end of the next slab; but not every joint was thus concealed, since the left end of the slab first mentioned was exposed and carved with a honeysuckle. Therefore, between any pair of slabs with lion heads, there must have been one or two slabs with merely the honey-

[1] Priene is exceptional, the axis of the column falling midway between two lion heads.

suckle and palmette. The spacing of the lion heads was either $2 \times 28 = 56$ dactyls, or $3 \times 28 = 84$ dactyls; and the intercolumniation was 112 dactyls (two spouts 56 dactyls on centres), 168 dactyls (two spouts 84 dactyls on centres, or three spouts 56 dactyls on centres), or 252 dactyls (three spouts 84 dactyls on centres). The first is too narrow, the last too wide; but 168 dactyls is exactly 2.80 times the lower diameter of the column (60 dactyls), the intercolumniation derived from a comparison with other structures.

The third piece of evidence is from the length of the naos, or whatever was within the colonnade.[1] Pliny gives this dimension as 63 Roman or Greek feet (*patet ab austro et septentrione sexagenos ternos pedes*); this is not a round number, and, being an easily obtainable ground measurement, may be accepted. It is not exact, but is more justified in Pliny's text than the correct length would have been. For the guide employed by C. Licinius Mucianus, Pliny's authority for the Mausoleum,[2] in telling the dimensions of the structure, would naturally give those of the naos with reference to the more prominent columns, according to which the naos was laid out; and 63 Roman or Greek feet are exactly six intercolumniations, each intercolumniation being $10\frac{1}{2}$ Greek feet ($2.80 \times 3\frac{3}{4}$ Greek feet).

The height of the column is less easily settled. From Pliny we learn that the order "*attollitur in altitudinem xxv cubitis*," *i.e.* $37\frac{1}{2}$ Greek or Roman feet (36.38 feet English); this, however, is a round number in a guide's story, which cannot be trusted without reserve. The actual remains seem to give little more help. The entablature, as put together from existing fragments in the British Museum, is 8 feet $8\frac{13}{16}$ inches high. The column could not be constructed from original drums; so Penrose[3] studied the different inclinations in the contours of the existing drums caused by the entasis, and decided that the height was 8.33 diameters; this cannot be blindly accepted, since he failed in the case of Priene, using the

[1] Pliny, XXXVI, 30, *cingitur columnis xxxvi*.

[2] See Jex-Blake and Sellers, *The Elder Pliny's Chapters on the History of Art*, pp. lxxxv–xci.

[3] See *Antiquities of Ionia*, IV, 1881, p. 18, note 3.

same method. As now restored in the British Museum, the column is 28 feet 6 inches, or 7.84 diameters, in height; the entire order, including the entablature, is 37 feet $2\frac{13}{16}$ inches, or 10.24 diameters. I shall attempt to prove that the height of the column was 32.01 English feet, and that of the entire order 40.74 feet. The column of 28 feet 6 inches is clearly much too low; those at Priene were 8.81 diameters high, and to fall in with the development, those of the Mausoleum should be slightly less. And other dimensions, as the intercolumniation and the height of the entablature,[1] show that the Mausoleum was no exception to the general tendency.

We may obtain the height of the Mausoleum column by a system of ratios. *First*, the height of the column in terms of the entablature height. At Priene this, if a frieze had existed, would have been 3.73 (earlier examples unknown), at Miletus 4.29, in the Smintheum about 4.50, and at Aizani 5.34; for a building of the date of the Mausoleum, slightly earlier than Priene, we might assume the ratio to be 3.65 : 1; then the column height would be 3.65×2.40 diameters $= 8.76$ diameters. *Second*, the height of the column in terms of the intercolumniation. At Priene this is 3.23, at Ephesus 3.40, at Miletus 3.56, and in the Smintheum less than 4.00; for the Mausoleum we might assume the ratio 3.15 : 1, giving a column height of $3.15 \times 2.80 = 8.82$ diameters. Thus we have three results, 8.76, 8.81, and 8.82; the mean between these is 8.80 diameters. The correctness of this seems evident when we note that the height of the entire order would be $8.80 + 2.40 =$ 11.20 diameters, exactly four times the intercolumniation, a proportion likely at the date of the Mausoleum (Priene, with a frieze, would have the ratio 4.07 : 1), and an obvious ratio which Pythius would have been likely to select when first working out his system. Therefore I make the height of the column 8.80 diameters, or 33 Greek feet, equivalent to 32.01 English feet.

The shaft of the column of course diminished from bottom to top. The lower diameter has been determined as 60 dactyls. Pullan gives the upper diameter as 2.965 English feet, equiva-

[1] This will be determined later as 2.40 diameters, between the 2.51 at Messa and the 2.34 at Priene.

lent to 48 dactyls, or $\frac{4}{5}$ of the lower diameter. But at Messa the upper diameter is given as 0.844 m., $\frac{5}{6}$ of the lower diameter; and at Priene, where the column is on a greater scale, the upper diameter is 3 feet, 12 dactyls Greek, or $\frac{6}{7}$ of the lower diameter, somewhat after the manner of the rules given by Vitruvius (III, 3, 12). Therefore we should expect in the Mausoleum, where the scale of the column is about that at Messa (between 30 and 35 Greek feet in height), an upper diameter $\frac{5}{6}$ of the lower. Measurements in the British Museum give

circumference about upper part of fluting . . .	9 ft., 13.00 dact.
∴ resulting diameter	49.97 dact.

or rather 50 dactyls, $\frac{5}{6}$ of the lower diameter.

The shafts were built up with drums; in the centre of each was fixed a bronze barrel-shaped dowel, 6 in. long, probably used as a pivot for revolving. There are 24 channels, slightly segmental, the centres from which they were described being in the circumference of the column; the channels end at top and bottom in curves tangent to the horizontal, as at Priene, not deeply undercut as at Messa; the width of each fillet is about $\frac{1}{8}$ that of the channel. At the top and bottom the line of the shaft curves out to a fillet and astragal; the upper astragal is beaded at Messa and Priene, but not in the Mausoleum. At the junction of the shaft with base and capital are sinkages 2 inches deep to preserve the mouldings from injury by pressure.

The base of the column was necessarily of the Asiatic form (two scotiae with a torus above), rather than the Attic form (a scotia between two tori), which did not appear in Asia Minor until the time of Hermogenes. At first the Asiatic base consisted only of the disk with the scotiae, and the torus, as in the temples of Ephesus (archaic), Samos, Magnesia (archaic), and Messa; the heights are: at Ephesus 41 dactyls, or 50 % of the lower diameter; at Samos 0.752 m. or 40 % of the diameter; and at Messa 0.435 m. or 42 % of the diameter. Then Pythius introduced a plinth under the disk, and reduced the heights of the other members, as at Priene and Miletus; the heights are now: at Priene 43 dactyls, or 61 % of the lower diameter, and at Miletus 62 dactyls, or 57 % of the diameter. We should therefore expect a plinth in the case of the Mausoleum, though

none was found; the two other members measure, disk 13 dactyls, torus 9 dactyls, total 22 dactyls, or 37 % of the diameter, showing the reduction made by Pythius and too low even for a base designed without a plinth. The heights of the different members of these bases are (in dactyls):

in the Mausoleum . . .	plinth ?	disk with scotiae 13	torus 9
at Priene	plinth 16	disk with scotiae 16	torus 11
at Ephesus	plinth ?[1]	disk with scotiae 24½	torus 18
at Miletus	plinth 24	disk with scotiae 24	torus 14

All four bases were evidently designed on about the same proportions—the torus, 58 % to 73 % of the disk, and the disk equal to the plinth. Therefore the plinth of the Mausoleum should be 13 dactyls high, making the entire base 35 dactyls, or 58 % of the lower diameter, like others of the type. The torus has seven horizontal channels as compared with nine at Messa and Priene. Here the whole torus is channelled, though at Priene, later, the upper half, in the case of the outer columns, is kept smooth so as not to hold water. The scotiae are parabolic curves, separated by pairs of astragals with fillets. The spread of the plinth is six times its height at Priene and Miletus; such a proportion would make it, in the Mausoleum, 78 dactyls wide, or 1.30 lower diameters (1.37 at Priene, 1.29 at Miletus).

The capital is composed of three members — the abacus, the cushion ending in volutes, and the ovolo. The heights of these members in the Mausoleum, as compared with those of other orders, are in dactyls:

Messa	abacus 3½	cushion 11[1]	ovolo 8	total 23
Mausoleum . . .	abacus 2½	cushion 11	ovolo 6	total 19½
Priene	abacus 5	cushion 12	ovolo 9	total 26
Ephesus	abacus 7	cushion 22¾	ovolo 17	total 46¾

These show no regularity of proportion; the height from the bottom of the ovolo to the top of the abacus varies from 37 % of the lower diameter at Priene to 47 % at Ephesus, while the Mausoleum has the lowest capital of all, 32½ % of the

[1] A block found by Wood under a disk with scotiae has a height of 23½ dactyls. Murray (*J. B. Archit.* III, 1895, p. 42 and Fig. 3) believes this to have been part of the stylobate. The recent excavations may have solved this question.

diameter. The cushion is about half the height of the whole capital (50 % at Messa, 56 % in the Mausoleum, 46 % at Priene, and 49 % at Ephesus); the ovolo about a third (35 % at Messa, 31 % in the Mausoleum, 35 % at Priene, and 36 % at Ephesus); the remaining sixth is occupied by the abacus (15 % at Messa, 13 % in the Mausoleum, 19 % at Priene, and 15 % at Ephesus). Usually in Asia Minor the abacus is a bold ovolo carved with the egg-and-dart, while the ovolo below the cushion has a tremendous overhang, as compared with examples in Greece, which were on a smaller scale and seen from a less distance. In the Mausoleum the capitals (Fig. 3) were so far above the

FIGURE 3. — CORNER CAPITAL OF THE MAUSOLEUM.

ground that they had to be carefully designed to tell from below; the vertical portion, the cushion, is made higher than in any other Asiatic example, and the projecting members, the abacus and ovolo, are made comparatively low but with a great overhang, for only their under faces were to be seen; the abacus is therefore carved with the cyma reversa and the heart-and-dart, better adapted to its thinness than the bold ovolo.

After the abacus and ovolo had been cut, the cushion remained in the rough, a block bounded at front and back by two parallel planes, making the width a little more than the upper diameter of the column, 51 dactyls, while in the length space was allowed for the volutes. Then on the front and back faces, 26 dactyls on either side of the axis of the column (so as to be a little beyond the upper diameter), and $14\frac{1}{2}$ dactyls below

the bottom of the abacus (so as to be at about half the height of the ovolo) was fixed a point which should be the centre of the eye of the volute and about which the construction of the volute was worked out. The innermost portion of the volute, where the convolutions would have been too small to count, was concealed by the "eye"; a circle about 4 dactyls in diameter described around the centre point of the volute, and within this a second circle with a diameter of about $3\frac{1}{4}$ dactyls. The surface inside this second circle, containing the construction points of the volute, was removed to a depth of about 2 dactyls; in this cavity was set a boss, fastened with lead, so that it could project beyond the plane of the volute without causing a great waste of material. The bolster side of the capital, which is 51 dactyls wide, is left plain except for two pairs of astragals in the centre, 11 dactyls apart, bordering a band decorated with laurel leaves.

The entablature of the Mausoleum was composed of the usual three divisions, — epistyle, frieze, and cornice. Most of their members have been preserved, and we need only careful measurements to have a correct restoration of the whole.

The epistyle, including three fascias and the crowning mouldings, was built up in two courses of stone, the lower with two fascias, and the upper with the top fascia and a rebate in which was set the crowning moulding.[1] In this the construction was unique; for Messa, Priene, and Ephesus all have the three fascias on a single stone, with the crowning moulding on the edge of a thin overhanging slab.

The width of the soffit of the architrave was regulated by the capital directly below. At Messa, where the bolster side of the capital is 50 dactyls (0.924 m.; Koldewey measures 0.92), the soffit is also 50 dactyls, and the decorated band in the middle of the bolster side of the capital is carried along the soffit as a sinking. And at Priene the bolster side is 4 Greek feet (1.183 m.), and the soffit hardly narrower (1.167 m.). Likewise we find that in the Mausoleum the soffit continues the 51 dactyls of the bolster, and the plain sinking in the soffit

[1] To save expense, the mouldings of the Mausoleum are usually worked separately and set in rebates.

continues the 11-dactyl laurel band in the middle of the bolster, leaving 20 dactyls on either side (British Museum, No. 984).

The three fascias of the epistyle were not proportioned after any universal rule. At Messa and at Ephesus the lowest is very much smaller than the others. But at Miletus the three fascias are $16\frac{3}{4}$, $20\frac{1}{2}$, and $24\frac{1}{4}$ dactyls (given as 0.31, 0.38, 0.45 m.); thus they form an *arithmetical* progression, with a constant difference of $3\frac{3}{4}$ dactyls. And at Priene, where they measure $12\frac{1}{2}$, $14\frac{1}{2}$, and $16\frac{3}{4}$ dactyls (0.231, 0.269, 0.310 m.), we find a *geometrical* progression, with 1.16 as a common multiplier. So in the Mausoleum the measurements $11\frac{3}{4}$, $13\frac{5}{8}$, and $15\frac{3}{4}$ dactyls clearly show a geometrical progression, with 1.156 as common multiplier. The total height of the three fascias is $41\frac{1}{8}$ dactyls. In addition to the overhangs of the different fascias, $1\frac{1}{2}$ dactyls apiece, they lean forward slightly, as in all Ionic epistyles, so that the upper edge is 4 dactyls beyond the line of the soffit, or $29\frac{1}{2}$ dactyls from the centre of the column.

The moulding which crowns the epistyle varies in height, in different orders, from $27\frac{1}{2}\%$ to $37\frac{1}{2}\%$ of the sum of the fascias; at Messa it equals the largest fascia, $13\frac{1}{2}$ dactyls, while at Priene it is $12\frac{1}{4}$ dactyls (0.226 m.), less than the smallest fascia. In the Mausoleum, however, it is smaller than in any other example; for, on account of the peculiar structure of the frieze, it was to be surmounted by other mouldings which would naturally count with it. Both series of mouldings together formed 30% of the sum of the three fascias, or $12\frac{12}{25}$ dactyls, as will be shown. But the architrave mouldings formed only part of this; the rebate measures $6\frac{7}{8}$ dactyls in height, making the entire architrave exactly 3 Greek feet in height. The form of this moulding was usually an ovolo (with egg-and-dart) and astragal (with bead), at Messa with a fillet at the top, but usually without, as at Priene and Ephesus; Miletus and the Smintheum have a hollow above the ovolo. The Mausoleum would naturally have the simple ovolo and astragal, and such a moulding was found (No. 994 in British Museum); it fits the rebate and projects 6 dactyls beyond the top fascia.

The frieze is always a comparatively thin slab set on edge;

in the Mausoleum it is $17\frac{3}{4}$ dactyls thick and $48\frac{1}{2}$ dactyls high.[1] The height of the field alone varies from 53 % to 55 % of the lower diameter at Messa, Miletus, and the Smintheum ; but in the Mausoleum it measures $41\frac{1}{8}$ dactyls, or $62\frac{1}{2}$ % of the lower diameter.[2] It was enlarged because it was to be enriched with sculpture, and this at an enormous height from the ground; thus the inner frieze of the Parthenon is about 3 feet 4 inches high and 40 feet above the stylobate, while here the frieze is only about 2 feet 6 inches high and the distance above the ground almost twice as great as in the case of the Parthenon frieze.

For the same reason the frieze was thrown forward as far as possible, and was thus more easily seen from below. This was natural in the Ionic order; at Messa the frieze is 0.07 m. in advance of the soffit of the epistyle; even this was not enough for the Mausoleum. Of course the face of the frieze could not, with any regard for beauty, be set directly over the nose of the epistyle moulding below; at Messa it is set back 0.10 m. from the nosing. The expedient adopted was to set the face of the frieze *in advance* of the epistyle moulding, but with a moulding

[1] That is, assuming that the so-called Amazon frieze was the frieze of the order. Portions of three friezes have been found, depicting an Amazonomachia, a Centauromachia, and a chariot race. The Centauromachia is in coarse marble, 88 cm. (= 3 Greek feet) high, including a 15 cm. moulding at the bottom but none at the top ; the lower moulding is of a peculiar form (*Ant. Denk.* II, 2, p. 5) which shows that the frieze was intended for insertion in a wall, the field sunk below, but the lower edge and the fillet flush with the face of the wall; thus a sharp shadow at the top and bottom framed the sculptured band; the mouldings could not possibly have been designed for an entablature. Again, the Charioteer frieze, also 3 Greek feet high, is an impossible member for an entablature ; the slabs are so thin (4 to 7 inches) that they could not have helped to support a cornice, while the fine marble and less carefully fitted joints, as well as the excellent preservation of the surface and even of the colored background, prove that it must have been under cover. Only the Amazon frieze, then, is left for the order ; and we shall find that it exactly fits. We know that a frieze was necessary, to give sufficient height in the superstructure to allow for the heavy ceiling beams and the corbelled "vaulting" which must have sustained the pyramid.

[2] The height of the frieze slab in Newton, *Hist.* II, p. 170, is $2'\ 11\frac{1}{2}''$; in *Brit. Mus. Cat.* II, p. 95, is $2'\ 11\frac{3}{8}''$; in *Ant. Denk.* II, 2, p. 5, is 0.90 m. ; mean result $48\frac{5}{8}$ dactyls ; my measurement is $48\frac{1}{2}$ dactyls. From this subtract the upper astragal and fillet, 2 dactyls, and the lower mouldings, $5\frac{3}{8}$ dactyls, total $7\frac{3}{8}$ dactyls. Then the field of the frieze, which must include the congé at the top and the slope above the bottom mouldings, is $41\frac{1}{8}$ dactyls, exactly equal to the sum of the three fascias of the epistyle.

carved on the bottom which seemed to be part of the epistyle moulding, and to project beyond the frieze (Fig. 4). The profile of this moulding varies slightly.[1] but the average dimensions

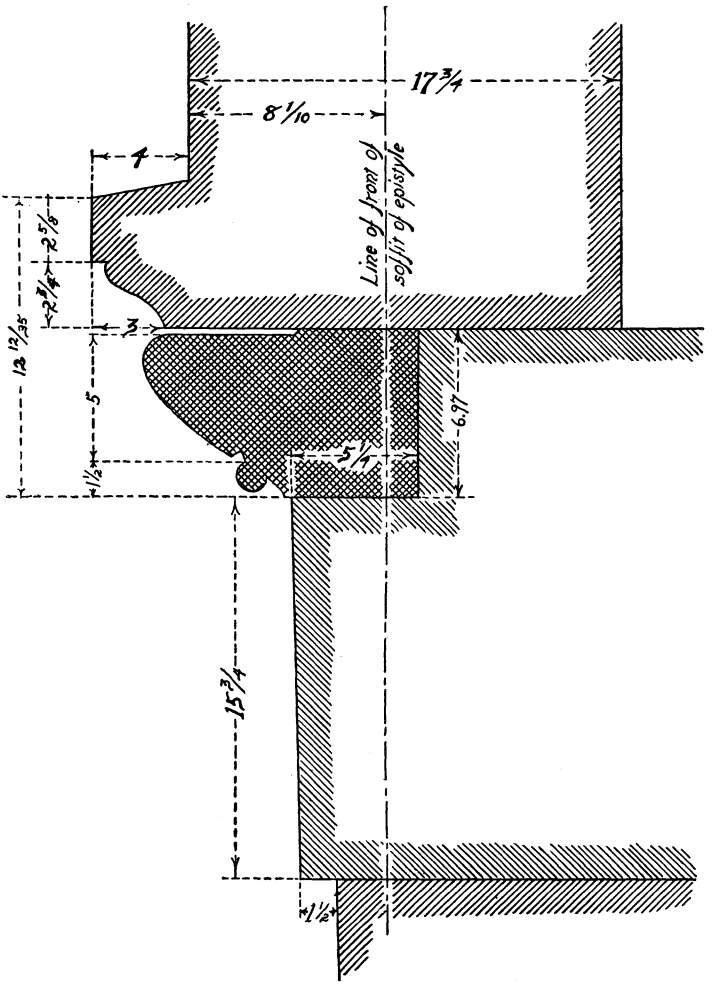


FIGURE 4. — CROWNING MOULDINGS OF THE EPISTYLE.

are as shown; the height (without the upper slope, which forms part of the frieze proper) is $5\frac{3}{8}$ dactyls, and by it the frieze is set 33.6 dactyls in advance of the centre of the column.

[1] *Ant. Denk.* II, 2, p. 6.

With the frieze, as its crowning moulding, we must include the member which forms the bed-mould below the dentils. This moulding, always an ovolo carved with the egg-and-dart, was usually made separate from the frieze proper, as at Messa and Miletus. When it had a congé below, as in the Mausoleum and Smintheum and at Ephesus, it was constructed in one of three ways (Fig. 5): it might be carved in one block with the

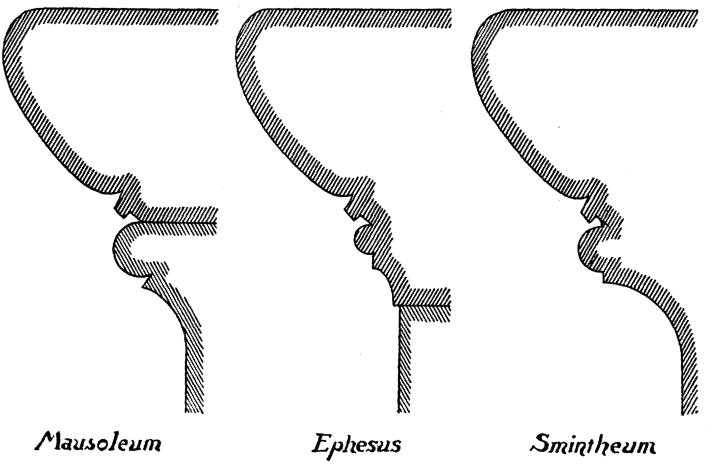


FIGURE 5. — CROWNING MOULDINGS OF IONIC FRIEZES.

frieze, as in the Smintheum; the joint might be below the congé, as at Ephesus (British Museum, No. 1231)[1]; or the joint might be between the astragal and the ovolo, the method adopted in the Mausoleum. The astragal is carved together with the congé on the frieze block; a separate ovolo (without an astragal, which must, therefore, have been on a separate block), 6 dactyls high, is on the same scale, making the height of the crowning mouldings 8 dactyls. These, with the crowning mouldings of the architrave, make up 20¼ dactyls, almost exactly half the height of the frieze proper or of the fascias of the epistyle; Pythius must have had this in mind when he laid out the entablature.

The cornice is built up of several courses, usually one for the dentils, one for the geison, and one for the sima; sometimes the bed-mould of the geison is carved on the dentil blocks, as at

[1] Cf. the frieze at Miletus. Pontremoli and Haussoullier, *Didymes*, Pl. 10.

Priene, and probably in the Mausoleum; sometimes on the geison blocks, as at Messa. The total height of the cornice is given by Pullan[1] as 0.830 + 0.143 + 0.710 + 0.805 = 2.488 feet, equivalent to $41\frac{1}{36}$ dactyls; it was clearly intended to be equal to the frieze proper, and to the fascias of the epistyle.

We are now in a position to reconstruct the height of the entablature. The fascias of the epistyle $41\frac{1}{8}$, the frieze proper $41\frac{1}{8}$, the cornice $41\frac{1}{36}$, and the crowning mouldings of the epistyle and frieze $20\frac{1}{4}$, make up a total of more than $143\frac{1}{2}$ dactyls, or, as it should be corrected, 144 dactyls, 9 Greek feet or 8.73 English feet. Of this, the fascias of the epistyle, the frieze proper, and the cornice, each form two-sevenths, or $41\frac{1}{7}$ dactyls; the crowning mouldings of the epistyle and frieze together are one-seventh, or $20\frac{4}{7}$ dactyls.

For the heights of most of the members of the cornice I must rely on Pullan's measurements. The height of the dentil course, however, is certain; it was one-third that of the cornice, or 13.7 dactyls (given by Pullan as 0.83 feet = 13.67 dactyls). This height was practically fixed by a desire to give scale to the monument through dentils of uniform size, wherever employed. Thus the temple at Messa and the Mausoleum have orders of about the same size, while that at Priene is a fifth again as large. But the dentils in the last were not mechanically enlarged; their height was kept nearly 13 dactyls (13.5 at Messa, 13.7 at the Mausoleum, 13.125 at Priene); at Ephesus and Miletus they become colossal, in the latter $31\frac{1}{2}$ dactyls high.

The spacing of the dentils was kept in the neighborhood of 16 dactyls (on centres), from the same desire to give scale. But in practice this dimension had to be modified to fit the intercolumniation and the spacing of the lion heads on the sima. Thus at Messa, where there were two lion heads to the intercolumniation of 10 Greek feet, we find ten dentils in the same distance, spaced 16 dactyls or 0.296 m. on centres (given as 0.16 + 0.14 = 0.30 m.). At Priene, with three lion heads in the intercolumniation of 12 Greek feet, there were fifteen dentils spaced 0.237 m. on centres (given as 0.145 + 0.093 = 0.238 m.). And in the Smintheum, with an intercolumniation of 9.765 Eng-

[1] Newton, *History of Discoveries*, I, pl. 22.

lish feet, we have twelve dentils spaced 0.813 English feet (given as 0.485 + 0.330 = 0.815 feet). Similarly in the Mausoleum, of about the same size as the temple at Messa, we should expect to have ten dentils if there were two lion heads, or nine dentils if there were three lion heads to the intercolumniation. We find that there were ten dentils with a spacing of 16.8 dactyls or 1.019 English feet (given by Pullan as 0.583 + 0.420 = 1.003 English feet).

With ten dentils we should expect two lion heads; the question as to whether there were two or three was left in doubt on

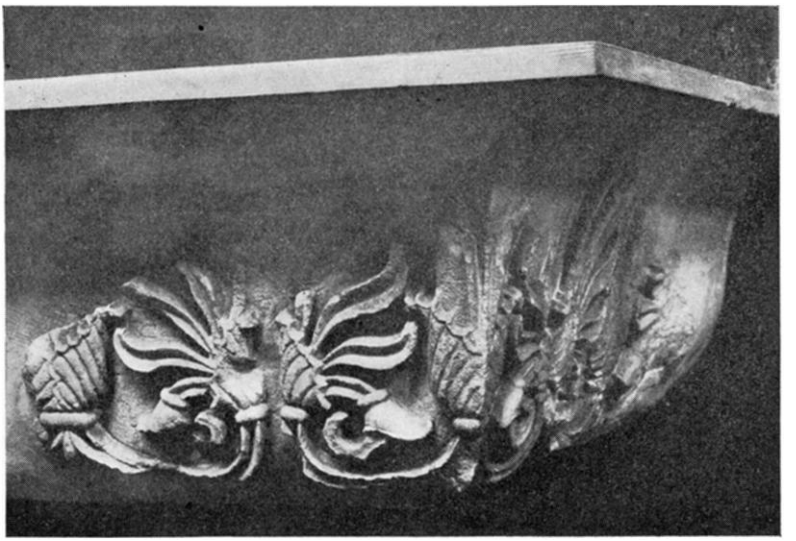


FIGURE 6. — CORNER BLOCK OF SIMA.

p. 10. It can be settled by reference to the overhang of the cornice beyond the front of the soffit of the epistyle. A sima block, from the angle of the cornice in the British Museum (Fig. 6), shows a palmette $12\frac{1}{2}$ dactyls from the end of the nosing, and then, 7 dactyls farther in, a honeysuckle; other blocks show that there must have been another palmette, and then the joint under the lion's head; therefore the angle block, when complete, measured $7 + 7 + 7 + 12\frac{1}{2} = 33\frac{1}{2}$ dactyls along the nosing. Now if there were two lion heads 84 dactyls apart, as we should expect, and one were placed over the axis of the

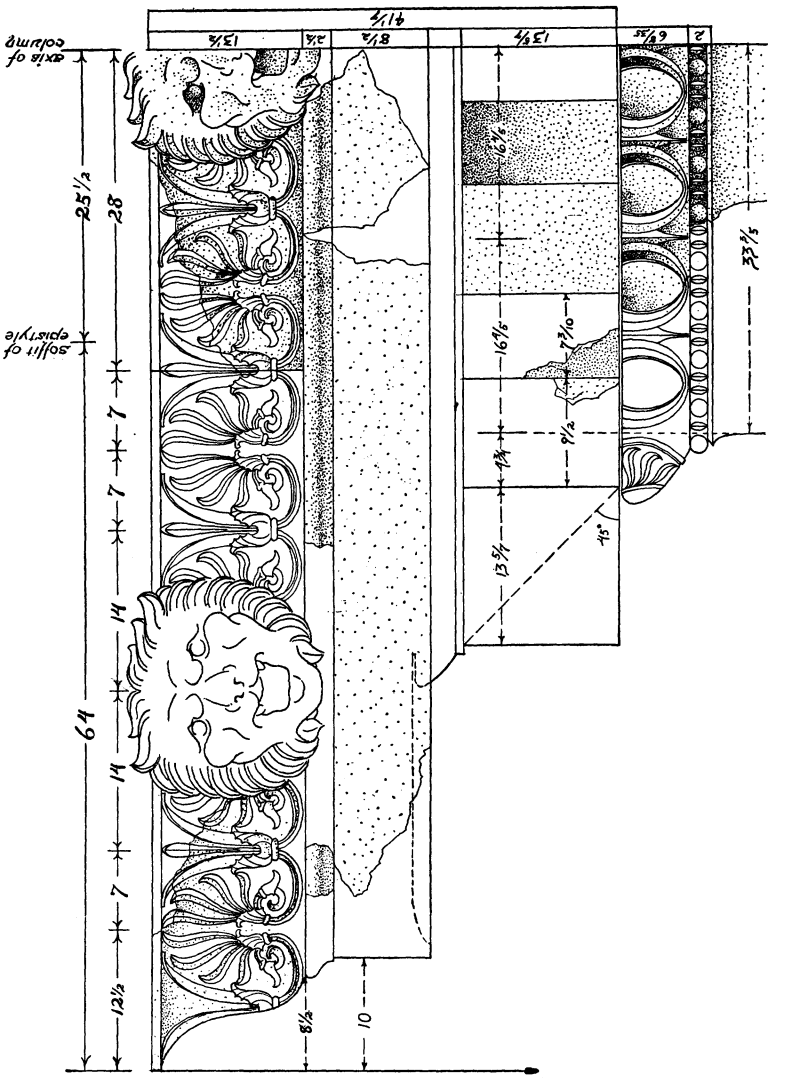


FIGURE 7. — CORNICE RESTORED, WITH EXISTING FRAGMENTS.

column, the overhang of the sima would be $84 + 33\frac{1}{2} - 25\frac{1}{2}$ (half the width of the soffit) = 92 dactyls, far too great. And if they were still 84 dactyls apart, but placed with the point halfway between them directly over the column axis, as at Priene,[1] the overhang would be $42 + 33\frac{1}{2} - 25\frac{1}{2} = 50$ dactyls, much too small. We must, therefore, adopt the conclusion that Pythius combined the close lion head spacing of Priene, three heads to the intercolumniation, with the sima height ($13\frac{1}{2}$ dactyls), and the dentil scale of Messa. For lion heads 56 dactyls apart, with one over the axis of each column and two between, give an overhang of $56 + 33\frac{1}{2} - 25\frac{1}{2} = 64$ dactyls, 4 Greek feet; the projection of the nosing beyond the axis of the outermost column is therefore $64 + 25\frac{1}{2} = 89\frac{1}{2}$ dactyls.

The angle block of the sima gives the projection of the nosing beyond the setting line on the bottom of the block as $8\frac{1}{2}$ dactyls. A moulding crowning the geison sets the face of the geison about 10 dactyls back from the nosing of the sima. The under surface of the geison is finely dressed to a point about 21 inches from the front, "where there is a slight rise, as if for a bed";[2] thus the projection of the geison beyond the dentils is about 28 dactyls (which I correct to 27.45); the dentils then are set back 37.45 dactyls from the nosing of the sima (Fig. 7). The dentils have a projection equal to their height, or 13.7 dactyls; Pullan gives the width of the dentil as 0.583 English feet = $9\frac{1}{2}$ dactyls, so that the axis of the outermost dentil is 4.75 + 13.7 + 37.45 = 55.90 dactyls from the line of the nosing of the sima. Now if the sima projects $64 + 25\frac{1}{2} = 89\frac{1}{2}$ dactyls from the centre of the column, the centre of the outermost dentil must be 89.50 − 55.90 = 33.60 dactyls beyond the column axis; and 33.60 is exactly twice the dentil spacing (2 × 16.8), so that the centre of a dentil came over each column axis, and there only coincided with the spacing of the lion heads. As shown by the projection of the ovolo below the dentils, the line of the frieze is exactly under the centre of the outermost dentil, *i.e.* 8.1 dactyls in front of the soffit of the epistyle. This distance, 8.1 dactyls, is exactly filled by the overhangs of the different mouldings and fascias of the epistyle.

[1] Wiegand and Schrader, *Priene*, p. 105. [2] *Brit. Mus. Cat.* II, p. 82.

This very detailed study of the different members of the entablature seemed necessary in order to obtain its correct dimensions, for by their aid we may determine several important parts of the structure. We may accept the vertical dimension, from the soffit of the epistyle to the top of the nosing of the sima, as 9 Greek feet, and the horizontal dimension, from the soffit of the epistyle to the nosing of the sima, as 4 Greek feet, a proportion of 9 : 4.

We may sum up the general proportions of the order of the Mausoleum as follows: Pythius, in laying out his cella and placing the peristyle about it, obtained an intercolumniation of $10\frac{1}{2}$ Greek feet. The ratio of column diameter to intercolumniation was at this period about 1 to 2.80, and this resulted in the reasonable diameter of 60 dactyls; if it had not come out a round number, such as $3\frac{3}{4}$ feet, the ratio would have been slightly varied until it gave a reasonable unit. Then the total height of the order was made four times the intercolumniation, 42 Greek feet or 11.20 diameter units. This total height was divided into seven parts, of which $1\frac{1}{2}$ were assigned to the entablature and $5\frac{1}{2}$ to the column; thus the entablature was 9 Greek feet or 2.40 diameters, and the column 33 Greek feet or 8.80 diameters. As a result of these proportions, we find that the ratio between support (column $3\frac{3}{4}$ feet) and void (space between columns $6\frac{3}{4}$ feet) is 5 to 9; also that the total amount of solid (column $3\frac{3}{4} \times 33 = 123\frac{3}{4}$; entablature $10\frac{1}{2} \times 9 = 94\frac{1}{2}$; total $218\frac{1}{4}$ square feet Greek) is very nearly equal to the total amount of void (space between columns $6\frac{3}{4} \times 33 = 222\frac{3}{4}$ square feet Greek).

Seven was again employed as the dividing number in the case of the entablature. Its total height, 9 Greek feet (2.40 diameters), was divided into seven parts, of $20\frac{4}{7}$ dactyls each; of these, two were assigned to the three fascias of the epistyle; two to the frieze proper (without mouldings); and two to the cornice; while the last was divided between the crowning mouldings of the epistyle and those of the frieze.

With the order determined, we are enabled to decide certain important dimensions both in plan and elevation, and from these we may restore the design of the Mausoleum.

(To be continued.)

APPENDIX

The table of the proportions of the orders is based on the following data.

NEANDRIA

R. Koldewey, *Neandreia: 51stes. Winckelmannsprogramm*, Berlin, 1891, pp. 22–49.

Lower diameter measured 0.53 m. (= 1.74 ft.).

Height of column unknown.

Height of entablature unknown.

Intercolumniation of row of columns in centre of naos 2.43 m.

EPHESUS, ARCHAIC TEMPLE

A. S. Murray, *J.H.S.* X (1889), pp. 1–10, pl. 3–4.

A. S. Murray, *J. B. Archit.* III (1895), pp. 52–54.

W. Wilberg, *Forschungen in Ephesos*, Vienna, 1906, I, pp. 221–234.

Lower diameter: the largest shaft fragment found gives a diameter of 1.33 m. (= 4.37 ft.), exactly 4½ Greek ft.

Height of column: Vitruvius (IV, 1, 7) says that the Ionic order originated in the temple of Diana, thereby meaning Ephesus, as shown by the repetition of the same tradition by Pliny (XXXVI, 56). Now Vitruvius had not seen these Greek temples, but derived his information from treatises on their architecture; the oldest that he employed was a treatise on the Artemisium by its architects, Chersiphron and Metagenes (Vitruvius, VII, praef. 12). His theory that the oldest order had a height of 8 diameters, and that this oldest order was at Ephesus, must therefore have been derived from Chersiphron's treatise; Pliny also states that the earliest order at Ephesus was 8 diameters high, including capital and base, and his knowledge of the temple seems to have been derived entirely from Chersiphron. So we still have, indirectly preserved, the statement by the architect of the temple that its columns were 8 diameters high.

Height of entablature unknown; only the cornice, 3 ft. high, preserved.

Intercolumniation: the normal spacing on the sides is 5.23 m. (Wilberg).

SAMOS

P. Girard, *B.C.H.* IV (1880), pp. 383–394.

Perrot and Chipiez, *Histoire de l'Art*, VII, pp. 615–617.

Πρακτικά, 1903, pp. 10–11 (cf. *Ath. Mitt.* XXVIII, 1903, p. 471; *A. J. A.* VIII, p. 352).

Lower diameter measured 1.867 m. (= 6.12 ft.), exactly 6 ft. 5 dactyls.

Height of column: one column still stands to a height of 10.497 m. The diameter at the top drum of the preserved portion is 1.488 m., and the ovolo and necking of a capital found near by give the upper diameter of the column as 1.353 m. So, if the diameter decreases from

1.867 to 1.488 m. in a height of 9.745 m. (the shaft only), to taper to 1.353 m., we should need a shaft 13.215 m. high, or probably less on account of the entasis. Including base and capital (half of which is missing), the total height was originally about 15 m., *i.e.* 8.035 lower diameters.

Height of entablature unknown.

Intercolumniation: Girard gives the spacing of the columns at the ends of the flanks as 4.92 m., but the excavations of the Greek Archaeological Society indicate that there were irregularities in the diameter of the columns and in the intercolumniation.

The recent excavations have shown that there were two large temples on this site, and that the second temple had marked architectural peculiarities. No detailed report of these excavations has been published.

MESSA

R. Koldewey, *Die antiken Baureste der Insel Lesbos*, Berlin, 1890, pp. 47–59, pls. 18–26.

Lower diameter measured 1.04 m., *i.e.* $3\frac{1}{2}$ Greek ft. (correct to 1.035 m. = 3.39 ft. Eng.).

Height of column unknown.

Height of entablature measured 2.61 m.

Intercolumniation measured 2.96 m. or 10 Greek ft. (2.957 m.).

PRIENE

Rayet and Thomas, *Milet et le Golfe Latmique*, II (1880), pp. 1–24 and pls.

R. P. Pullan, in *Antiquities of Ionia*, IV (1881), ch. I, pls. 1–21.

Wiegand and Schrader, *Priene*, Berlin, 1904, pp. 81–119.

Lower diameter: Measured by Pullan as 4.23 ft. (= 1.289 m.); but Schrader's measurements vary from 1.245 to 1.295 m. Of these I select 1.293 m., midway between Pullan and Schrader's highest (the most likely to be correct), because it is exactly 4 ft. 6 dactyls Greek (= 4.24 ft. Eng.), and because the upper diameter, 1.12 m. (=3 ft. 12 dactyls) is exactly $\frac{6}{7}$ of such a lower diameter.

Height of column: From a study of the entasis of the drums, F. C. Penrose (*Antiquities of Ionia*, IV, pp. 56–58) obtained a height of 43.28 ft. (42.30 ft. without the plinth), considerably over 10 diameters, and obviously too slender. E. L. Hicks (*Ancient Greek Inscriptions in the British Museum*, III, pp. 6–7) arranged in their original order the inscriptions with regard to the Samian dispute, cut on the pronaos wall and anta of the temple, and thus determined the height of 16 courses as 23 ft. $\frac{1}{4}$ in.; my measurements of the same stones in the British Museum (Nos. 399–405) give 23 ft. $12\frac{3}{4}$ dactyls Greek. Above this was the anta capital (No. 1127 in Brit. Mus.), in two courses, 13 and $15\frac{1}{2}$ dactyls. Four courses remain *in situ*, with a height of 2.04 m. (= 6 ft. $14\frac{1}{4}$ dactyls). The gap between the portion in the British Museum and that *in situ* must have been occupied by four courses, because of pairs of wide

courses alternating with single narrow courses (Wiegand, pp. 96–98); and these with average heights $27\frac{1}{2} + 15 + 27\frac{1}{2} + 27\frac{1}{2}$ dactyls, would make 6 ft., $1\frac{1}{2}$ dactyls. The total height of the anta, and therefore of the columns, was 38 ft. 9 dactyls, which, with a lower diameter of 4 ft. 6 dactyls, would be 8.814 diameters.

Height of entablature: Unfortunately the entablatures of this period are all so fragmentary that their restoration requires rather complicated proof. In the case of Priene, we have epistyle and cornice, but no frieze; for Ephesus, the three fascias of the epistyle, various ovolos, and the sima of the cornice; and of the entablature of the Milesian temple nothing was known until Pontremoli's excavations yielded that of the east front, minus the upper part of the cornice, which was never finished. Not one is complete, so all must be studied together, compared with each other and with the related entablatures of Messa and the Smintheum. A few corrections should be made in the published measurements; at Priene the cornice measures 1.035 m. ($3\frac{1}{2}$ Greek ft.), and the epistyle, given as $0.810 + 0.226 = 1.036$, should likewise be 1.035 m.; at Miletus the epistyle, given as 1.57 m., is exactly 5 ft. 5 dactyls (1.571 m.), and the frieze, measured as 1.38 m. is 4 ft. $10\frac{1}{2}$ dactyls (1.377 m.). In the dimension for the height of the frieze I include, as its crowning moulding, the ovolo, which at the same time serves as the bed-mould of the dentils.

Dimensions and proportions of remaining members:

	Epistyle	Frieze	Cornice	Total
Messa . . .	0.937 m.	0.820 m.	0.853 m.	2.610 m.
	.901 dia.	.788 dia.	.820 dia.	2.509 dia.
Priene . . .	1.035 m.	—[1]	1.035 m.	2.070 m.
	.800 dia.	—	.800 dia.	1.600 dia.
Miletus . . .	1.571 m.	1.377 m.	—	—
	.787 dia.	.690 dia.	—	—
Smintheum .	2.889 ft.	2.560 ft.	3.055 ft.	8.504 ft.
	.746 dia.	.662 dia.	.789 dia.	2.197 dia.

In these we see a constant rate of progress, depending upon the chronological place of the temple in the series. The incomplete entablatures may be restored by considering the relations, 1) of each member to the corresponding member in the entablatures of other temples; 2) of each member to the other members of the same entablature; and 3) of the total entablature thus resulting to the complete entablatures of other orders. Finally, 4), the result thus obtained should be slightly modified so as to bear a relation either to the other members of the

[1] The frieze in the temple at Priene is actually omitted; see note on p. 6. To bring it into relation with contemporary examples, I have, in the next table, restored a frieze of the dimensions which it would have assumed, had it existed.

same entablature (by some definite ratio) or to the Greek standard of measure. A table restored according to these regulations, in terms of the column diameters of the orders concerned, follows:

	Epistyle	Frieze	Cornice	Total
Messa	.901	.788	.820	2.509
Priene	.800	(.743)	.800	(2.343)
Miletus	.787	.690	(.792)	(2.269)
Smintheum	.746	.662	.789	2.197

Height of entablature for Priene would have been, if complete, 2.343 diameters. Intercolumniation measured 3.53 m. and was laid out as $11\frac{1}{2}\frac{1}{2}$ Greek ft. (3.524 m.).

EPHESUS, LATER TEMPLE

J. T. Wood, *Discoveries at Ephesus*, London, 1877.

A. S. Murray, *J. B. Archit.* III (1895), pp. 41–54.

Lower diameter given by Wood (p. 265) as 6 ft. $0\frac{1}{2}$ in.; *i.e.* 100 dactyls (correct to 6 ft. $0\frac{3}{4}$ in.).

Height of column given by Pliny (XXXVI, 95) as 60 ft., equivalent to 58.20 ft. Eng.; this, while only approximate, is fairly close, as is shown by a comparison with the proportions at Miletus.

Height of entablature unknown; three fascias of architrave 65 dactyls.

Intercolumniation varies on the fronts, but the normal spacing on the sides is given by Wood as 17 ft. $1\frac{1}{2}$ in.

MILETUS

Rayet and Thomas, *Milet et le Golfe Latmique*, II, 1885, pp. 25–81 and pls.

Pontremoli and Haussoullier, *Didymes*, Paris, 1904.

Lower diameter given by Thomas as 1.98 m., but Greek figures on the unfinished drums, giving the diameter to which each was to be cut, show that the lower diameter was $6\frac{3}{4}$ Greek ft., equivalent to 1.99 m. (= 6.52 ft.).

Height of column measured by Thomas as 19.40 m.

Height of entablature restored above as 2.269 dia. = 4.52 m.

Intercolumniation measured 5.48 m.; probably it was really $18\frac{1}{2}$ Greek ft. (5.47 m.).

SMINTHEUM

R. P. Pullan, *Antiquities of Ionia*, IV, 1881, ch. III, pls. 26–30.

Lower diameter measured 3.87 ft. (4 Greek ft. = 3.88 ft. Eng.).

Height of column uncertain, uppermost drum of shaft missing.

Height of entablature measured 8.504 ft.

Intercolumniation measured 9.765 ft.; it was probably really laid out as $10\frac{1}{1}\frac{1}{2}$ Greek ft. (= 9.782 ft. Eng.).

MAGNESIA

C. Humann, *Magnesia am Maeander*, Berlin, 1904, pp. 38–90.
Lower diameter measured 1.40 m., exactly $4\frac{3}{4}$ Greek ft. (= 4.61 ft. Eng.).
Height of column unknown.
Height of entablature measured 2.958 m., or 10 Greek ft. (2.957 m.).
Intercolumniation measured 3.94 m. (correct to 3.93 m. = 2.80 diameters = 13.3 Greek ft.).

TEOS

R. P. Pullan, *Antiquities of Ionia*, IV, 1881, ch. II, pls. 22–25.
Lower diameter measured 3.38 ft. ($3\frac{1}{2}$ Greek ft. = 3.39 ft. Eng.).
Height of column unknown.
Height of entablature measured 7.19 ft.
Intercolumniation measured 10.70 ft. (11 Greek ft. = 10.67 ft. Eng.).

APHRODISIAS

N. Revett, *Antiquities of Ionia*, III, 1840, ch. II, pls. 13–19.
Lower diameter measured 3 ft. 7.35 in.
Height of column measured 30 ft. 7.15 in.
Height of entablature measured 7 ft. 11.5 in.
Intercolumniation measured 8 ft. 5.40 in.

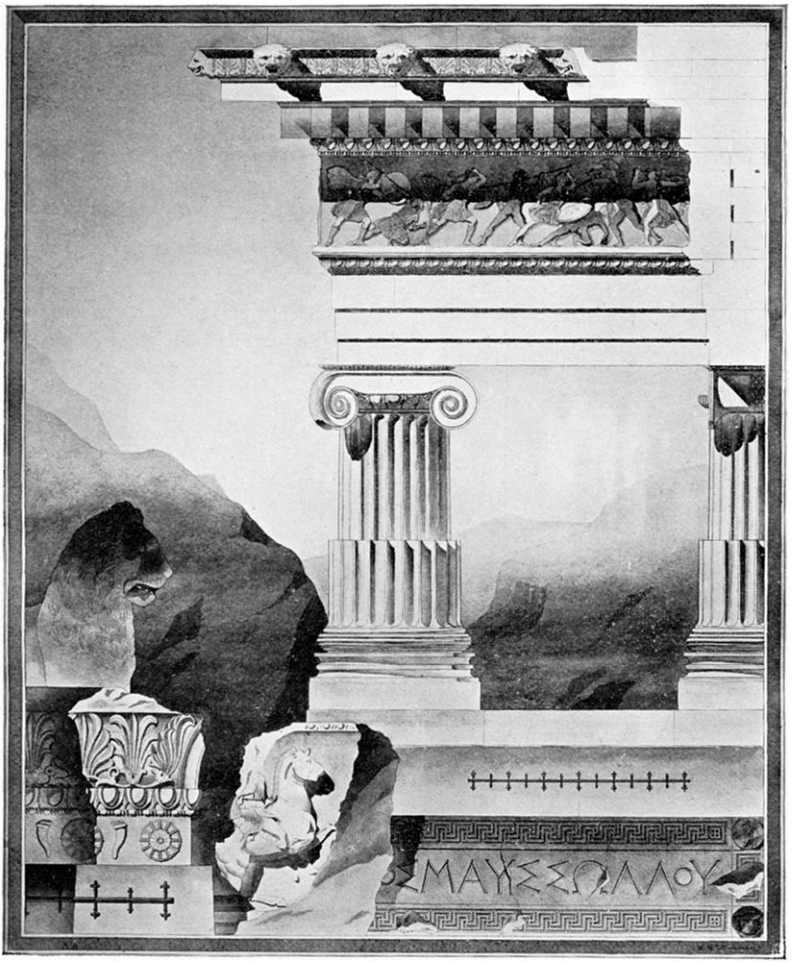
AIZANI

C. Texier, *Description de l'Asie Mineure*, I, Paris, 1839, pls. 23–33.
Lower diameter measured 0.977 m. (= 3.21 ft.).
Height of column measured 9.604 m.
Height of entablature measured 1.797 m.
Intercolumniation measured 2.536 m.

LABRANDA

N. Revett, *Antiquities of Ionia*, I, 1821, ch. IV, pls. 1–5.
Lower diameter measured 2 ft. 10.35 in.
Height of column measured 27 ft. 2.80 in.
Height of entablature measured 5 ft. 6.60 in. without sima, which would add about 8.4 in. more, making 6 ft. 3 in.
Intercolumniation measured 8 ft. 7 in.

WILLIAM B. DINSMOOR.



THE ORDER OF THE MAUSOLEUM, HALICARNASSUS